

## CLAIMS

What is claimed is:

- 1 1. A method of automatically subscribing a network device to a plurality of events  
2 applicable to a logical group of which the network device is a member, comprising  
3 the computer-implemented steps of:  
4 creating and storing a mapping that associates a plurality of network devices with the  
5 logical group and that associates the logical group with one or more events  
6 that can pass over an event bus to which the network device is logically  
7 coupled;  
8 receiving a device identifier of one of the network devices in the logical group;  
9 receiving an event that is among the one or more events that are in the mapping;  
10 based on the mapping, sending information to the network device that causes the  
11 network device to receive all events that are associated in the mapping with  
12 the logical group in which the network device participates.
- 1 2. A method as recited in Claim 1, wherein sending information to the network device  
2 that causes the network device to receive all events comprises the steps of subscribing  
3 the network device to all the events that are in the mapping and associated with the  
4 network device at an event gateway that is coupled to the event bus.
- 1 3. A method as recited in Claim 1, further comprising the steps of receiving application-  
2 specific mapping information from an application program and updating the mapping  
3 using the application-specific mapping information.
- 1 4. A method as recited in Claim 2, further comprising the steps of receiving application-  
2 specific mapping information from an application program in XML format using a  
3 data access component that transforms the application-specific mapping information  
4 from XML format into a canonical object model format.

1 5. The method as recited in Claim 1, wherein the step of creating and storing a mapping  
2 comprises the steps of receiving information identifying a mapping in a data store that  
3 associates a plurality of network devices with the logical group and that associates the  
4 logical group with one or more events that can pass over an event bus to which the  
5 network device is logically coupled.

1 6. A method as recited in Claim 1, wherein sending information to the network device  
2 that causes the network device to receive all events comprises the steps of generating,  
3 based on the mapping, a list of all the events that are in the mapping and associated  
4 with the network device, and sending the list to an event gateway that is coupled to  
5 the event bus.

1 7. A method as recited in Claim 1, wherein the mapping comprises an association of  
2 stored values that identify for each network device, an application, a group identifier,  
3 an event, a network device identifier, one or more published events, and one or more  
4 subscribed events.

1 8. A method as recited in Claim 1, wherein sending information to the network device  
2 that causes the network device to receive all events comprises the steps of:  
3 receiving a call from a calling application program to a Resolve method, wherein the  
4 call includes one or more selection criteria selected from among device  
5 identifier, event subject, or action desired;  
6 generating, based on the mapping, a list of all the events that are in the mapping and  
7 associated with the network device based on the selection criteria;  
8 returning the list to the calling application program.

1 9. A method as recited in Claim 1, further comprising the steps of creating and storing  
2 the mapping using a plurality of programmatic objects that conform to an object  
3 model consisting of: a group item class, wherein each group item object instantiated  
4 from the group item class may comprise one or more group objects that are  
5 instantiated from a group class or one or more device objects that are instantiated  
6 from a device class; one or more application objects that are instantiated based on an  
7 application class; and one or more event objects that are instantiated based on an  
8 event class.

1 10. A method as recited in Claim 1, further comprising the steps of:  
2 creating and storing the mapping using a plurality of programmatic objects that  
3 conform to an object model consisting of: a group item class, wherein each  
4 group item object instantiated from the group item class may comprise one or  
5 more group objects that are instantiated from a group class or one or more  
6 device objects that are instantiated from a device class; one or more  
7 application objects that are instantiated based on an application class; and one  
8 or more event objects that are instantiated based on an event class;  
9 for one of the event objects, creating and storing one or more subject values that  
10 associate an original event subject with the event object, a subscribed mapping  
11 attribute value that specifies one or more subscribe events, and a publisher  
12 mapping attribute value that specifies one or more publish events.

1 11. A method as recited in Claim 1, wherein the specified call time value represents a  
2 disconnect time associated with the packet flow.  
3 creating and storing the mapping using a plurality of programmatic objects that  
4 conform to an object model consisting of: a group item class, wherein each  
5 group item object instantiated from the group item class may comprise one or  
6 more group objects that are instantiated from a group class or one or more  
7 device objects that are instantiated from a device class; one or more  
8 application objects that are instantiated based on an application class; and one  
9 or more event objects that are instantiated based on an event class;  
10 for one of the application objects, creating and storing one or more event attribute  
11 values that associate event objects with the application object, a name attribute  
12 value that specifies a unique name of the application, and one or more item  
13 attribute values that associate one or more group items with the application.

1 12. A method as recited in Claim 1, further comprising the steps of:  
2 creating and storing the mapping using a plurality of programmatic objects that  
3 conform to an object model consisting of: a group item class, wherein each  
4 group item object instantiated from the group item class may comprise one or  
5 more group objects that are instantiated from a group class or one or more  
6 device objects that are instantiated from a device class; one or more  
7 application objects that are instantiated based on an application class; and one  
8 or more event objects that are instantiated based on an event class;  
9 for one of the event objects, creating and storing one or more subject values that  
10 associate an original event subject with the event object, a subscribed mapping  
11 attribute value that specifies one or more subscribe events, a publisher  
12 mapping attribute value that specifies one or more publish events, and a  
13 subscribed default flag value that indicates whether an external computation is  
14 carried out to determine the subscribe events.

1 13. A method as recited in Claim 12, further comprising the steps of determining whether  
2 the subscribed default flag value is clear, and if so, sending information to the  
3 network device that causes the network device to receive all events that are associated  
4 in the mapping with the logical group in which the network device participates.

1 14. A method as recited in Claim 12, further comprising the steps of determining whether  
2 the subscribed default flag value is set, and if so, sending information to the network  
3 device that causes the network device to receive one or more events based on  
4 computing a new list of events using an external algorithm.

1 15. A method as recited in Claim 1, wherein receiving a device identifier comprises  
2 receiving a subscribe request that includes a router identifier for one of the network  
3 devices in the logical group and an event identifier.

1 16. A method as recited in Claim 15, wherein sending information to the network device  
2 that causes the network device to receive all events that are associated in the mapping  
3 with the logical group in which the network device participates ordering comprises  
4 looking up the router identifier and the event identifier in the mapping and receiving a  
5 subject list in response thereto.

1 17. A method as recited in Claim 15, wherein sending information to the network device  
2 that causes the network device to receive all events that are associated in the mapping  
3 with the logical group in which the network device participates ordering comprises  
4 looking up the router identifier and the event identifier in the mapping, receiving a  
5 subject list in response thereto, and applying the subject list to the network device at  
6 the event gateway.

1 18. A method as recited in Claim 1, wherein receiving a device identifier comprises  
2 receiving a publish request that includes a router identifier for one of the network  
3 devices in the logical group or a group identifier of the logical group, and an event  
4 identifier.

1 19. A method as recited in Claim 18, wherein sending information to the network device  
2 that causes the network device to receive all events that are associated in the mapping  
3 with the logical group in which the network device participates ordering comprises  
4 looking up the router identifier, or the group identifier, and the event identifier in the  
5 mapping and receiving a subject list in response thereto.

1 20. A method as recited in Claim 18, wherein sending information to the network device  
2 that causes the network device to receive all events that are associated in the mapping  
3 with the logical group in which the network device participates ordering comprises  
4 looking up the router identifier, or the group identifier, and the event identifier in the  
5 mapping, receiving a subject list in response thereto, and applying the subject list to  
6 the network device at the event gateway.

1 21. A method of automatically subscribing a router in a network to a plurality of events  
2 applicable to a logical group of which the router is a member, comprising the  
3 computer-implemented steps of:  
4 creating and storing a mapping that associates a plurality of routers with the logical  
5 group and that associates the logical group with one or more events that can  
6 pass over an event bus to which the router communicates;  
7 receiving a subscribe request from the router that includes a router identifier that  
8 uniquely identifies the router an event identifier;  
9 looking up the router identifier and the event identifier in the mapping;  
10 receiving a subject list in response thereto, wherein the subject list identifies all  
11 subjects to which the router should subscribe;

12 sending information to the event bus that requests the event bus to subscribe the router  
13 to all events in the subject list.

1 22. A computer-readable medium carrying one or more sequences of instructions for  
2 automatically subscribing a network device to a plurality of events applicable to a  
3 logical group of which the network device is a member, which instructions, when  
4 executed by one or more processors, cause the one or more processors to carry out the  
5 steps of:  
6 creating and storing a mapping that associates a plurality of network devices with the  
7 logical group and that associates the logical group with one or more events  
8 that can pass over an event bus to which the network device is logically  
9 coupled;  
10 receiving a device identifier of one of the network devices in the logical group;  
11 receiving an event that is among the one or more events that are in the mapping;  
12 based on the mapping, sending information to the network device that causes the  
13 network device to receive all events that are associated in the mapping with  
14 the logical group in which the network device participates.

1 23. An apparatus for automatically subscribing a network device to a plurality of events  
2 applicable to a logical group of which the network device is a member, comprising:  
3 means for creating and storing a mapping that associates a plurality of network  
4 devices with the logical group and that associates the logical group with one or  
5 more events that can pass over an event bus to which the network device is  
6 logically coupled;  
7 means for receiving a device identifier of one of the network devices in the logical  
8 group;  
9 means for receiving an event that is among the one or more events that are in the  
10 mapping;  
11 means for, based on the mapping, sending information to the network device that  
12 causes the network device to receive all events that are associated in the  
13 mapping with the logical group in which the network device participates.

1 24. An apparatus for automatically subscribing a network device to a plurality of events  
2 applicable to a logical group of which the network device is a member, comprising:  
3 a network interface that is coupled to the data network for receiving one or more  
4 packet flows therefrom;  
5 a processor;  
6 one or more stored sequences of instructions which, when executed by the processor,  
7 cause the processor to carry out the steps of:  
8 creating and storing a mapping that associates a plurality of network devices  
9 with the logical group and that associates the logical group with one or  
10 more events that can pass over an event bus to which the network  
11 device is logically coupled;  
12 receiving a device identifier of one of the network devices in the logical  
13 group;  
14 receiving an event that is among the one or more events that are in the  
15 mapping;  
16 based on the mapping, sending information to the network device that causes  
17 the network device to receive all events that are associated in the  
18 mapping with the logical group in which the network device  
19 participates.